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Anthurium Decline: Options for Controlling Burrowing Nematodes

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Plant decline caused by burrowing nematode is not uncommon in Hawaii's anthurium production. Anthurium decline reduces the number of flowers produced per year, the size of the flowers, and the productive life of an anthurium planting. The severity of the decline is closely related to the population of the nematodes at the time the field is planted. Lower nematode populations at planting result in less damage to the plant. Our goal is to employ production practices that reduce and limit nematode populations in anthuriums.

Preparations for a new planting

Field preparation is important because preventative controls applied in advance of planting are often are easier, safer, and more available than therapeutic controls applied to infected plants. The planting area should be well drained and designed such that there is no running or pooling of water. Installation of drainage ditches may be necessary. Clean planting material is of paramount importance. The medium—cinder, rocks, or another soil-less planting mixture—must be free of leftover anthurium debris or any plant roots. Burrowing nematodes have been found in above-ground plant parts, including leaf stems.

New medium

Cinder or rocks from a clean (no plants present) quarry transported in clean trucks will be free of nematodes. Soil-less planting mixtures, while not sterile, are not contaminated with burrowing nematodes. If the medium becomes infested with burrowing nematodes, anthurium plants grown in cinders suffer less decline than those grown in a soil-less potting mixture.

Old or previously used medium

Old medium can be treated with pesticides like Vapam® or Telone® II to eliminate burrowing nematodes that may be present. Read and follow label directions when using these pesticides. Wet or dry heat can be used to kill any nematodes that may be present in the medium. At 95°F (35°C), more than 8 hours are needed to kill burrowing nematodes. At 120°F (49°C), the nematodes survive for only 10 minutes. These nematode can survive for months at 90°F (32°C).

A bare fallow maintained weed free for 3–6 months will eliminate the burrowing nematode. During the fallow, it is important that even small anthurium root and stem pieces decompose before replanting occurs. Otherwise, the nematodes may still be present in the planting bed.

Planting material

Ensuring that the planting material is free of burrowing nematodes will greatly help in controlling anthurium decline. Tissue-cultured plants that you grow out yourself are the safest way to ensure clean planting material. Purchase planting material only from reputable dealers, preferably ones that produce plants certified free of burrowing nematode. Because the nematodes may be present in stem tissue, top cuttings may be infected. Treating top cuttings with 120°F (49°C) water for 12 minutes will eliminate any burrowing nematodes. However, anthurium bacterial blight is not controlled by this temperature. Therefore, anthurium plants must be blight free. Anthurium cultivars differ in their tolerance of elevated temperatures, so always test your specific cultivars to be sure.

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Above-ground cultivation

Physical separation of the anthurium plants from the ground will avoid introduction of burrowing nematodes. Anthuriums can be grown in pots or bags on benches. For nematode control, the benches need only to be 2–3 inches (5–8 cm) off the ground (for certification, the requirements are different). Alternatively, anthuriums can be grown in pots or bags placed on weed cloth or plastic mulch. The burrowing nematode cannot move up through weed cloth or plastic mulch, and it cannot crawl up the leg of a bench. Therefore, both physical separation methods limit anthurium root contact with potentially infested ground.

Established plantings

Therapeutic treatments are usually the least effective control option. Prevention is much better. Very few effective postplanting nematicides are currently available. The old industry standard Nemacur® (fenamiphos) will be removed from the market soon.

Nematicides

DiTera® has proven effective in reducing anthurium decline and is a low-risk pesticide. DiTera has given the best control when applied at 30 lb/acre (34 kg/ha) once every 3 months. Generally, frequent applications of DiTera at a lower rate is best. Quarterly application of 30 lb/acre (34 kg/ha) is more effective than semiannual application at 60 lb/ac (67 kg/ha). Always read and follow label directions on all pesticides.

Removing old plants or weeds

Exercise caution when removing old plants or weeds from beds. Infected plant tissues or used medium can contaminate surrounding clean beds. Temporarily covering adjacent beds or walkways with shade cloth or plastic can prevent spill-over and contamination.

Cultivar selection

No cultivars have been identified that are resistant to nematode reproduction. 'Kalapana' supported very low nematode reproduction, whereas 'Nitta' supported very high nematode reproduction under controlled conditions. Variability exists among anthurium hybrids in the numbers of burrowing nematodes that reproduce on them and in the severity of decline associated with nematode infection. Thus some cultivars may perform better in certain fields prone to burrowing nematode infestations.

Anthurium species are also variable in their response to nematode infection. *A. ravenii* was identified as the most resistant of six species tested.

Theoretically, alternating more resistant cultivars with more susceptible cultivars between beds, as well as planting burrowing nematode–free stock on the upslope beds, will limit and slow nematode infestations.

Frequently asked questions

Are nematodes in irrigation water?

Generally, no. If water is not cloudy with soil, the probability of nematode contamination is near zero.

Will the nematodes move into a greenhouse with rain water?

Yes. Nematode spread is likely to be facilitated by rainfall that is sufficient to cause runoff. Consequently, diverting surface runoff *around* greenhouses rather than through greenhouses is beneficial.

Can nematodes be carried on tools or shoes?

Yes. However, if the equipment or shoes do not have soil or plant material on them, the tools are free of burrowing nematodes. Therefore, be certain that equipment and shoes are clean when entering any field and when moving from field to field.

When do you treat for nematode control?

If precautions have been taken in setting up a clean planting, postplanting nematicide applications are probably not necessary for the first couple of years. If precautions were not taken in setting up a clean planting, postplanting treatments should begin when the nematode population has reached 140/oz root (5/g root).

Is it a problem to have other burrowing nematode host plants near anthurium fields?

Generally, yes. Since nematodes can migrate with water, avoid planting aglaonema, pothos, and other aroids (including taro) adjacent to the anthurium greenhouses. Bananas also should not be planted near anthurium fields.